

## **FINAL MEETING SUMMARY**

### **HANFORD ADVISORY BOARD RIVER AND PLATEAU COMMITTEE**

*February 9, 2016*

*Richland, WA*

#### **Topics in this Meeting Summary**

Opening.....	1
Groundwater Update.....	2
Update on 618-10 Burial Ground Vertical Pipe Units .....	5
Environmental Restoration and Disposal Facility Update .....	9
Solid Waste Operations Complex Dangerous Waste Permit Modifications.....	12
Deep Boreholes .....	16
Committee Business.....	18
Attachments .....	20
Attendees .....	21

*This is only a summary of issues and actions discussed at this meeting. It may not represent the fullness of represented ideas or opinions, and it should not be used as a substitute for actual public involvement or public comment on any particular topic unless specifically identified as such.*

#### **Opening**

Pam Larsen, River and Plateau Committee (RAP) chair, welcomed the committee and introductions were made. Committee members adopted the January 2016 RAP meeting summary.

#### *Announcements*

Pam shared that the Tri-City Herald published an article regarding the Hanford Advisory Board's (HAB or Board) recent letter highlighting the importance of prioritizing Hanford funding for cleanup, as opposed to additional study by the Consortium for Risk Evaluation and Stakeholder Participation. Pam thanked RAP members for their assistance in drafting the letter.

Ryan Orth, committee facilitator, announced that committee leadership positions for 2016 were open for nominations. Ryan noted that committee members could submit nominations to the facilitation team, committee members would vote on 2016 leadership positions during committee meetings or calls in March, and that 2016 committee leadership would be seated in April.

## **Groundwater Update**

Shelley Cimon, issue manager, introduced the topic regarding an update on the state of groundwater contamination and treatment at the Hanford Site. She noted that the experimental polyphosphate injection into groundwater occurred in fall 2015 and that RAP members were interested in hearing additional information about the preliminary study results.

### *Agency Presentation*

Jon Peschong, U.S. Department of Energy – Richland Operations Office (DOE-RL), provided the RAP committee with an update on the state of groundwater contamination and treatment at the Hanford Site. Key point from Jon's presentation<sup>1</sup> include:

- DOE-RL oversaw the removal of approximately 240 tons of contaminants from 13.95 billion gallons of groundwater since the pump-and-treat facilities began operations.
- The Fiscal Year (FY) 2015 Annual Groundwater Report notes the following progress:
  - Treatment of 2.4 billion gallons of groundwater and removal of 84 tons of contaminants via pump-and-treat
  - Integration of site-wide groundwater and vadose zone cleanup activities
  - Ongoing monitoring of groundwater contamination plumes
  - Completed construction of the uranium treatment system at the 200 West Groundwater Pump-and-Treat Facility, as well as other necessary modifications to existing remediation systems and operations
  - Completed construction of the transfer pipeline to facilitate treatment of contaminated groundwater from 200 East Area at the 200 West Groundwater Pump-and-Treat Facility
  - Continued progress towards obtaining final remediation Records of Decision (RODs) in the River Corridor, and initiated the Remedial Investigation (RI) for the Orchard Lands
- In FY2016, DOE-RL will continue to operate groundwater pump-and-treat operations and meet well-drilling commitments per the Tri-Party Agreement (TPA) M-024 milestone. Planned and ongoing work includes:
  - Continued integration of site-wide groundwater and vadose zone cleanup activities, and continued implementation of needed modifications and maintenance to existing remediation systems and operations
  - Initiation of the new uranium treatment capabilities at the 200 West Groundwater Pump-and-Treat Facility, in accordance with the 200-UP 1 ROD

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**Attachment 1:** Groundwater Update (DOE-RL presentation)

- Expansion of the 200 West Groundwater Pump-and-Treat Facility with additional membrane bioreactors to increase treatment capacity
- Initiation of the expanded transient perched water treatment system to increase capacity and allow for easier blending within the pipeline
- Initiate Environmental Restoration and Disposal Facility (ERDF) leachate treatment at the 200 West Groundwater Pump-and-Treat Facility
- Continued operation of pump-and-treat facilities in the River Corridor and on the Central Plateau
- Continued progress towards obtaining final remediation RODs for the River Corridor and Central Plateau, and completing a RI for the Orchard Lands
- Continued implementation of ROD activities for 300 Area Uranium Sequestration and well drilling
- The amount of groundwater expected to be treated in FY2016 is less than the amount treated in FY2015 due to expansion work being done on the membrane bioreactors. Some groundwater will be treated offsite.
- The purpose of the 300-FF-5 Uranium Sequestration effort is to capture uranium and prevent it from entering the Columbia River. Phosphate injected into contaminated soils will render uranium immobile.
  - DOE-RL oversaw the test phase (Stage A) in November 2015. The test site was located on approximately 0.75 acres of land in the 300 Area.
  - Core samples were extracted from the soil located at the test site and sent to a lab for analysis and testing. A report highlighting the effectiveness of the test is expected to be released in May 2016.
  - Lessons learned from Stage A will be incorporated into Stage B (expected to occur between FY 2016 and FY 2017).

Jon's presentation included a video demonstrating the process for testing uranium sequestration via phosphate injection. He noted that the phosphate solution was injected into the soil using a drip system and that on-site meters ensure a proper flow rate of phosphate solution.

#### *Regulator Perspectives*

Dib Goswami, Washington State Department of Ecology (Ecology), noted that the 200 West Groundwater Pump-and-Treat Facility has a design life of 20-30 years, and he noted that it has already been operating for seven years. He emphasized that the facility is performing well and a cost-effective method for removing contaminants from groundwater. Dib encouraged DOE-RL to continue using the facility to its full potential throughout the extent of its design life.

Dennis Faulk, U.S. Environmental Protection Agency (EPA), mentioned that the recent 300-FF-5 uranium sequestration test is promising, noting that the original test did not achieve these higher levels of saturation.

### *Committee Questions and Responses*<sup>2</sup>

*Note: This section reflects individual questions, comments, and agency responses, as well as a synthesis where there were similar questions or comments.*

Q. What is the depth of penetration of the phosphate solution into the soil?

*R. [DOE-RL] The groundwater is found at approximately 80 feet in depth in the 300 Area. The phosphate penetrates to a maximum of 60-70 feet.*

Q. How long is the phosphate anticipated to sequester uranium contamination? Will it degrade over time?

*R. [DOE-RL] This method of uranium sequestration will render uranium contamination permanently immobile. The sequestration is not anticipated to degrade over time.*

Q. There are equal amounts of contamination in the groundwater in both the 200 East and the 200 West Areas. Will DOE-RL build a second pump-and-treat facility in the 200 East Area?

*R. [DOE-RL] Currently, DOE-RL may construct a second pump-and-treat facility in the 200 East Area; at the moment, the agency will continue using the 200 West Groundwater Pump-and-Treat Facility to its full capabilities.*

Q. Why are resins to capture iodine-129 from groundwater not incorporated into current pump-and-treat operations?

*R. [DOE-RL] DOE-RL has found that resin capabilities are continuing to improve. In the example of the uranium treatment, moving to new resins has resulted in higher rates of sequestration. DOE-RL is open to considering new treatment enhancements.*

Q. Where are the contaminants extracted from Hanford Site groundwater disposed of?

*R. [DOE-RL] Contaminants that meet ERDF waste acceptance criteria are disposed of at ERDF. Contaminants are removed and water is discharged back into the ground once treated.*

*R. Groundwater contamination generally occurs in low concentrations and water is run through a relatively low concentration of contamination in sequestration units at the pump-and-treat facility. The uranium captured in the resin will not release from the media and this waste is shipped to ERDF.*

Q. What is the maximum capacity of the 200 West Groundwater Pump-and-Treat Facility? What are the systems' limits?

*R. [DOE-RL] Currently, the system is operating at 80% nameplate capacity\*. That is not to say that the nameplate capacity governs the process. After the membrane bioreactors are installed, systems will be re-evaluated and the next “pinch point” for potential expansion will be identified.*

Q. What are the anticipated results for the uranium sequestration test? Does DOE-RL anticipate successful or unsuccessful results? If unsuccessful, what are the next steps?

*R. [DOE-RL] Results will be released in May 2016.*

*R. [EPA] If the ROD implementation does not work, then the agency returns to the public involvement process and implements additional public comment periods. Part of this design is to determine a more fit timeline in order to decide how much more investment goes into the current process.*

Q. The original plan consisted of a larger area for implementation of the phosphate injection into the soil. Will Stage B consist of a larger area of implementation?

*R. [EPA] If the results from Stage A are successful, DOE-RL will plan to implement phosphate injection over a larger area for Stage B.*

Q. How does the 200 West Groundwater Pump-and-Treat Facility affect the deep vadose zone?

*R. [Ecology] Deep vadose zone contamination is found at 44 sites. Thirty-five boreholes are expected to be dug within the coming years to monitor these contamination plumes. More information needs to be collected from the RI/Feasibility Study (FS) process, and this may take several years. A credible treatability test will be performed in FY 2017 – FY 2018.*

*R. [EPA] The limiting factor is how much water can be extracted and treated from the 200 East and West Areas without raising the water table, so that a deep vadose zone is maintained. The goal is to keep the water table balanced by pumping water back and forth in the East and West Areas.*

The committee thanked Jon, Dib, and Dennis for their perspectives. Groundwater issue managers expressed interest in receiving an update on the 300-FF-5 Uranium Sequestration Stage A Test in May 2016.

### **Update on 618-10 Burial Ground Vertical Pipe Units**

#### *Agency Presentation*

Bryan Foley, DOE-RL, provided the RAP committee with an update on the 618-10 Burial Ground vertical pipe units (VPU) remediation. Key points from Bryan’s presentation <sup>3</sup> include:

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\* Nameplate capacity refers to maximum rated capacity.

**Attachment 3:** Update on 618-10 Burial Ground Vertical Pipe Units (DOE-RL presentation)

- Within the burial ground there are 12 discrete trenches ranging from 20—25 feet in depth, and containing approximately 2,250 waste drums, as well as gloveboxes and processing equipment.
- 618-10 Burial Ground trench status:
  - Washington Closure Hanford (WCH) has retrieved approximately 1,600 drums, and there are several hundred drums remaining. The estimate is based on ground-penetrating radar and field observations.
  - Approximately 321,229 tons of waste were shipped to ERDF for disposal.
  - Concrete-shielded waste drums are being processed in grout within the trenches.
  - During remediation, workers discovered that trenches were deeper than what historical documents indicated. Workers also identified a metallic debris field containing additional drums within the trench.
  - Excavation is currently occurring within the trenches and is scheduled for completion by the end of the third quarter FY 2016, depending on the extent of the buried waste.
- Update on contamination event during a windstorm in November 2015:
  - Contamination was found near work boundaries during the post-workday survey of the area after processing concrete-shielded waste drums on November 16, 2015. Per administrative protocol, workers stabilized the burial ground with a fixative to prevent the spread of contaminants. Workers were aware of the forecasted high winds.
  - A significant wind event occurred on November 17, 2015, with winds reaching up to 70 mph. Workers surveyed the area after the storm. Results indicated that specks of contamination did travel outside of the fenced trench area. This spread of contamination did not place the workers or the public at risk for exposure.
  - Workers expanded the survey outside of the 618-10 Burial Ground. Any specks of contamination that they discovered were retrieved for disposal at ERDF.
  - After the initial surveys performed by workers, the Washington State Department of Health (WDOH) completed additional surveys. Results showed that contamination from the 618-10 Burial Ground did not spread outside of the fenced trench area. WDOH surveys did discover several spots of legacy contamination that had likely been dispersed by tumbleweeds or animals.
  - In response to the contamination event, DOE-RL implemented corrective actions to reduce the risk of future contamination spread, including: (1) revising the grout sampling method to eliminate exposure of dry material to the atmosphere, (2) placing plastic bags around materials that need to be sampled for contaminants, and (3) modifying the fixative application process to allow better fixative coverage when necessary.

- DOE-RL received a letter from the EPA expressing the agency's concerns regarding the spread of contaminations. DOE-RL is preparing a corrective action report for EPA and WDOH.
- VPU Status:
  - Ninety-four VPUs are located within the 618-10 burial ground, with three different designs.
  - Eighty overcasings were installed over VPUs in spring 2015. The remaining 14 VPUs are made of steel and cannot be augered; therefore, they do not require overcasings.
  - WCH performed mock-up drilling and method testing of augering systems. Augering began on September 28, 2015.
  - WCH's VPU scope includes augering material in 28 over-casings. WCH is ahead of the current schedule, with 24 over-casings completed by February 2016.
  - WCH's VPU scope includes retrieving 15 VPUs. The remediation of these VPUs is expected to occur in spring 2016.

Bryan closed by noting that the work at the 618-10 Burial Grounds was currently being conducted by WCH; however, he recognized that the contract for work would soon switch to CH2M Hill. Bryan noted that work transition was in progress.

#### *Regulator Perspectives*

Dennis Faulk, EPA, mentioned that data results indicate that the VPUs will be classified as low activity waste (LAW) and can be transferred for disposal to ERDF.

Ginger Wireman, Ecology, expressed concern about the wind storm events occurring at the Hanford Site. She questioned if agencies are looking at the frequency of wind storm events and if wind barriers should be built to prevent the future spread of contaminants.

*R. [EPA] The determination of additional measures to prevent the spread of contamination will be made after the results from the corrective action report are released. The plutonium waste sites identified for future action will likely be enclosed in order to avoid the spread of contamination during weather events.*

*R. [DOE-RL] Additional fences have been put up to prevent the spread of contaminants.*

*R. [WDOH] WDOH runs meteorological models twice daily to demonstrate potential weather conditions at the Hanford Site.*

## Committee Questions and Responses <sup>2</sup>

*Note: This section reflects individual questions, comments, and agency responses, as well as a synthesis where there were similar questions or comments.*

Q. How is legacy contamination distinguished from in-trench contamination from the 618-10 Burial Ground?

*R. [DOE-RL] Initial surveys conducted by WCH found specks of contamination between 120,000 -6.5 million disintegrations per minute (DPM)/cm<sup>2</sup>. WCH conducted hand-held surveys, which are best for surveying low energy particles for strontium-90.*

Q. What is the current excavated depth of the trench, and what is the anticipated volume increase?

*R. [DOE-RL] The trench is approximately 32 feet in depth. There have been several readings that indicate more debris lies at approximately 35 feet in depth. There have also been VPUs discovered next to waste drums. This equates to about a 30% volume increase in the trench.*

Q. At what point does sampling, including for transuranic waste (TRU), occur?

*R. [DOE-RL] Historical information did not indicate the precise center of the VPUs. A recalculation was performed and after the overcasings were installed and augering began, better stabilization and mixing started to occur. When the auger reaches the bottom of the VPU, the stem is separated and the instrumentation is lowered down into the center of the VPU.*

Q. Presuming that the waste from the 618-10 Burial Ground continues to be LAW and disposed of at ERDF, is the ultimate plan to have this waste site categorized for unrestricted use? The trench is very close to the road and years from now, people may be accessing this area.

*R. [EPA] Yes, the waste site will be remediated to unrestricted use standards. By default, agencies will make sure all contamination is cleaned up properly before public access is granted near this particular waste site.*

Q. Is the machinery that is extracting the waste material from the trenches exposed to airborne and surface contaminants? Why is grout not being utilized to suppress the spread of contaminants?

*R. [DOE-RL] The machinery has a protective spray and the liners that are used to capture the extracted waste are very similar to the metal liners used in a waste drum. The material from the VPUs will be packaged using a similar method. The difference is that grout will be added to the boxes. Grout can be used as a contamination control, but soils must be kept moist. DOE-RL found that if soils can be kept moist, there is a greater chance of controlling contamination.*

Q. What administrative controls are in place to stop the spread of contamination during weather events?



*R. [DOE-RL] DOE-RL stipulates that work at the 618-10 Burial Ground cannot occur when winds exceed 20 mph. There is a weather station at the burial ground that provides real-time wind speed to work crews.*

Q. Are fluids coming to the surface from the augering system and are those liquids being sampled?

*R. [DOE-RL] DOE-RL has not found liquids associated with waste from the augering process. A water and glycol mixture was added into the process to prevent the machine from freezing during cold weather periods. Some of this mixture was found to have leaked. DOE-RL performs sampling for all liquids that are encountered. To this date, there has been no issue of contamination.*

Q. Why did the augering process of VPUs eliminate the use of grout?

*R. [DOE-RL] Grout is a sufficient stabilizer, but can increase the chance for contamination when the grout dries. The original plan was to remove the overcasings and perform an additional augering process with grout. However, there were various hazards and contamination issues involved in removing the overcasings, therefore DOE-RL decided not to use grout.*

*C. The RAP committee would like to be informed of the protocols or processes that are changed to the augering process, moving forward.*

Q. How much does the remediation of the 618-10 Burial Ground site cost?

*R. [DOE-RL] After the wind storm event, costs increased slightly higher than expected, due to corrective action management.*

Q. Is there an incident report of the wind storm event that took place on November 17, 2015 that could be released to the RAP committee?

*R. [DOE-RL] Yes, there is an incident report that can be shared with the committee when published.*

Bryan stated that trench remediation is expected to be completed in FY 2016, and he noted that the committee could receive a progress update on ongoing work at the beginning of FY 2017. Brian will provide the RAP committee with a cost breakdown of the remediation of the 618-10 Burial Grounds, prior to the November windstorm event.

### **Environmental Restoration and Disposal Facility Update**

#### *Agency Presentation*

Bryan Foley, DOE-RL, provided the RAP committee with an update concerning the status of the vertical expansion at ERDF, the ROD waiver for the in-trench macroencapsulation, and leachate process occurring at ERDF. Key points from Bryan's presentation<sup>4</sup> include:

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**Attachment 4:** Environmental Restoration and Disposal Facility Update (DOE-RL presentation)

- The vertical expansion at ERDF will allow the continued disposal of Hanford Site wastes without a change in disposal operations across the Hanford Site. The vertical expansion will also meet existing regulatory requirements.
  - The existing ERDF liner, leachate collection, and instrumentation systems will support the vertical expansion.
  - Currently, there are ten ERDF cells that contain approximately 17.5 million tons of waste. Without expansion at ERDF, cells will be filled to capacity by 2017.
  - ERDF cells 1-4 are filled to capacity and protected by an interim cover. The interim cover will be removed or penetrated to ensure leachate generated from waste in the vertical expansion infiltrates into the underlying waste and leachate collection system.
    - ERDF cells 5-6 are filled to capacity.
    - ERDF cells 7-10 are nearly filled to capacity.
  - Vertical expansion will provide an additional 3.6 million tons of waste disposal capacity, and will extend existing and future cells a further 20 vertical feet. The uppermost surface of the waste fill will be crown-shaped, and it will be graded at 2% and with 12% side-slopes.
  - Expanding ERDF vertically has the potential to avoid an estimated \$30 million in costs to construct an additional disposal cell.
- Treatment of ERDF leachate:
  - Surface water runoff (liquid that has not contacted waste) will continue to be controlled to minimize contact with waste during the vertical expansion process. Currently, approximately 1.7 million gallons of leachate is collected from ERDF each year.
  - ERDF leachate, liquid that comes into contact with waste, is currently transferred by a pipeline to the Effluent Treatment Facility located in the 200 East Area. The 200 West Area Pump-and-Treat Facility was added as an option for the treatment of ERDF leachate.
  - EPA issued an Explanation of Significant Differences in October 2015 authorizing treatment of ERDF leachate at the 200 West Pump-and-Treat Facility.
  - The ERDF leachate pump station will be upgraded with new pumps and controls to transfer the leachate.
  - CH2M Hill Plateau Remediation Company will construct upgrades to allow for the first transfer of waste as early as May 2016.
- In-trench macroencapsulation:

- The in-trench macroencapsulation treatment method is only for specific pieces of large, hazardous waste. In-trench treatment will include a disposal cell area that is compliant with regulations and protects the environment, increases the operation area while keeping workers further from waste, and lowers waste treatment costs.
- The permit waiver for in-trench macroencapsulation was approved by EPA headquarters in December 2015. The controls and procedures to conduct in-trench treatment are currently being finalized by WCH, and implementation is expected to begin in late February 2016.

### *Committee Questions and Responses* <sup>2</sup>

*Note: This section reflects individual questions, comments, and agency responses, as well as a synthesis where there were similar questions or comments.*

Q. How does the Integrated Disposal Facility (IDF) fit into the overall strategy of cleaning up the Hanford Site?

*R. [DOE-RL] IDF was built to handle vitrified LAW from tank farms. Once the Waste Treatment and Immobilization Plant is operational, IDF will be permitted to accept vitrified LAW. Other low-level and mixed waste may also be accepted at the IDF once it acquires the correct permit.*

Q. Is the vertical expansion at ERDF adequately funded?

*R. [DOE-RL] Yes, but the expansion will not begin for several years.*

Q. Where is the volume of waste coming from that has required vertical expansion?

*R. [DOE-RL] The waste is from miscellaneous waste sites in the 100 and 300 Areas, including waste from the 618-10 Burial Ground.*

Q. Where is the excess soil coming from in order to construct the 20-foot vertical expansion?

*R. [DOE-RL] The soil will come from the adjacent trench, but the same amount of soil will be necessary to cover the landfill, regardless of the degree of vertical expansion.*

Q. What is the volume of leachate at ERDF? What is the anticipated timeline for the water that was added to move through the leachate system?

*R. [DOE-RL] There was 1.7 million gallons of leachate in 2015. Water is flowing thru the leachate system now. It will be approximately 10 years before the leachate stops infiltrating. There will be approximately 30 years of groundwater monitoring and leachate collection.*

Q. Will precipitation continue to filter through the final cap once the landfill is closed? Do TPA agencies anticipate that the amount of leachate will increase or decrease?

*R. [EPA] The final cap is designed to stop all percolation. Eventually, when the landfill is closed, a cap will be put in place to make ERDF a waterproof facility.*

Q. Is each item that is deposited into the landfill tracked?

*R. [DOE-RL] Yes, each item that is deposited is identified, surveyed, and tracked upon transfer to ERDF.*

Q. Has there been any public involvement process that has been considered in order to receive input about the decision to vertically expand ERDF?

*R. [EPA] No, there has not yet been a public involvement process for this project. The agencies will take this into consideration.*

*C. This project could be of great interest to the public and has the potential to generate a greater interest in cleanup at the Hanford Site. Therefore, information should be provided to the public and a comment period may be included in the overall design of the vertical expansion.*

*C. There may be impacts to Cultural Resources that deserve further evaluation, as well as consideration for Tribal review.*

Committee members thanked Bryan for the information. Topic issue managers anticipated that additional discussion and potential Board products may be explored for an upcoming committee meeting in either March or April 2016.

### **Solid Waste Operations Complex Dangerous Waste Permit Modifications**

#### *Agency Presentation*

Michael Collins, DOE-RL, provided the RAP committee with a presentation on the Solid Waste Operations Complex (SWOC) Dangerous Waste permit modifications. The presentation focused on a Class 3 Permit Modification Request to the Hanford Facility Resource Conservation and Recovery Act (RCRA) Permit. Key points from Michael's presentation <sup>4</sup> included:

- DOE-RL plans to hold a public meeting in March 2016 to relay information to the general public and answer questions regarding the Class 3 Permit Modification Request to the Hanford Facility Dangerous Waste Permit Part B, Low-Level Burial Grounds Trenches (LLBG) 31-34-94, T-Plant Complex, and Central Waste Complex (CWC) - Waste Receiving and Processing Facility (WRAP).
- Ecology issued the Hanford Facility RCRA Permit, Dangerous Waste Portion, in 1994. The current Permit Revision is REV 8C. The permit provides standard facility conditions, as well as

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**Attachment 4:** Solid Waste Operations Complex Dangerous Waste Permit Modifications (DOE-RL presentation)

unit-specific conditions for the operation, closure, and post-closure of operating unit groups (OUG).

- There are two dangerous waste management units (DWMUs) under the Unit Specific Conditions for Closure (Part V) portion of the Permit including CWC East side storage and CWC D-10 outside storage areas. Both DWMUs are located in the 200 West Area and provide storage for waste. These units are not accepting new waste and will begin closing in accordance with applicable closure regulations.
- The proposed permit modification request to the Hanford Site Wide Permit REV 8C is required by the Agreed Order and Stipulated Penalty Number DE 10156, Exhibit A Section 1.12.1. The proposed changes will allow for the final status (Part III) of the Permit on waste management operations and closure activities for the following units:
  - OUG 6 CWC – WRAP. This unit includes 13 DWMUs used for storage and treatment, and located in the 200 West Area.
    - Nine DWMUs are used for storage only. Units include a series of buildings, modules, and outdoor areas. They provide a place to stage containers prior to placement inside a specific building for storage/treatment, or in preparation for transportation to/from another facility.
    - Four DWMUs are used for storage and treatment. Units include a total of four buildings. Treatment of waste is conducted using a variety of technologies to meet the requirements of the Federal and State land disposal restrictions (LDR), and/or acceptance criteria for another approved facility.
  - OUG 9 T-Plant Complex. The unit includes 15 DWMUs used for storage and treatment, and located in the 200 West Area.
    - Nine DWMUs are used for storage only. Units include a series of buildings, cabinets, modules, and outdoor areas. Units provide a place to stage containers prior to placement inside a specific building for storage/treatment, or in preparation for transportation to/from another facility. This is long-permitted storage. T-Plant is expected to be used for sludge.
    - Six DWMUs are used for storage and treatment. Units include a total of three buildings with one contaminated building (221-T-Building) for treatment of un-containerized waste. Treatment of waste is conducted using a variety of technologies, meeting the requirements of the Federal and State LDRs, and/or acceptance criteria for another approved facility.
  - OUG 17 LLBG Trenches 31-34-94. This unit includes five DWMUs used for storage and treatment and disposal, and located in the 200 West and East Areas.
    - Two DWMUs are used for storage and treatment: LLBG Trench 31 and 34. Units provide container storage and treatment for mixed waste, as well as

LDR compliant containerized waste prior to disposal in the landfills. The treatment of waste is conducted using immobilization technologies to meet the requirements of Federal and State LDRs. Currently, no treatment is occurring inside the trench.

- Three DWMUs are used for disposal: LLBG Trench 31, 34, and 94.
  - LLBG Trenches 31 and 34 are two landfills that operate in accordance with disposal requirements for LDR compliant waste. They are constructed with soil and synthetic liners, as well as leachate collection and removal systems.
  - LLBG Trench 94 is a landfill that operates under an exemption request from applicable liner system requirements. It is a final disposal facility for defueled reactor compartments from the U.S. Department of the Navy.
- The permit modification request includes 10 addendums for each OUG that is added to the Permit (Part III).
- The Permit Modification Process is a multi-step process:
  1. DOE submits PMR to Ecology, the permitting agency and distributes public information materials, including notification of a public meeting.
  2. After the public meeting, there is a 60-day public comment period for all comments to be received by Ecology. The 60-day public comment period for this PMR ends at the close of business on Apr. 8, 2016.
  3. After the comments are collected and processed, Ecology will either approve or deny the PMR.
    - a) If approved, a draft permit will be prepared, notifications of the draft permit will be released to the public, and a public hearing may be requested. There is a 45-day public comment period on the draft permit. If the draft permit is approved, the PMR will move forward for approval.
    - b) If denied, a notice of deficiency will be issued for the PMR. If the PMR is approved, but the draft permit is denied, a new draft period will be prepared and/or the public comment period may be extended past the initial 45-day public comment period.

### *Regulator Perspectives*

Stuart Lutrell, Ecology, noted that Ecology will work to complete the completeness review process as soon as possible, then begin drafting a permit to be issued. The second public comment period will commence shortly thereafter.

## *Committee Questions and Responses* <sup>2</sup>

*Note: This section reflects individual questions, comments, and agency responses, as well as a synthesis where there were similar questions or comments.*

Q. How do you see the Board engaging in this process?

*R. [Ecology] Before Ecology engages in the public comment period and after DOE has prepared the application, Ecology would like to address the Board members and draw attention to how concerns and comments were addressed. Ecology would like to present the first draft of the permit to the RAP committee before it returns to the second comment period stage of the permitting modification process.*

Q. When would this presentation to the RAP committee occur?

*R. [Ecology] The agency has not completed the review process yet. Ecology will keep the involved agencies and the RAP committee informed as the process unfolds.*

Q. [EPA] How do Ecology and DOE operate together on this permit modification request process?

*R. [DOE-RL] Ecology participates in DOE meetings and vice versa. Ecology will have the opportunity to create a draft permit for public review. There will be a notetaker present to capture the comments and ensure accuracy for the agency.*

Q. The investigation that EPA did in 2011 became closures of DWMUs that were ordered in 2013. Are the units, or parts of units, that are currently being violated going to be closed? Is a closure plan going to be submitted to close the units that are required to be closed?

*R. [DOE-RL] DWMUs were ordered for closure by the EPA in 2013. DOE-RL is waiting for the process of approval. There is one approved so far. Closure and post-closure requirements refer to areas that will not be used. Some units will not undergo the closure process because they are currently being used. Once they are no longer in use, the closure process will begin. Closure plans have been submitted for all four SWOC facilities.*

Q. How are the agencies proceeding in remediating the Low-Level Burial Grounds Used Trenches “Green Islands” Closure Unit Group 26 area?

*R. [Ecology] The Green Islands will be addressed in a separate permit. Ecology is assessing which remediation activities can be capitalized for this separate permit, based on permits REV 8C and REV 9.*

Q. The HAB developed extensive comments and advice, regarding REV 8C. How and when will those comments be addressed?

*R. [Ecology] Ecology cannot respond to comments on REV 8C until the agency has received all public comments regarding REV 9. Ecology will respond to all public comments regarding REV*

*8C and REV 9, simultaneously. The goal is to align these two permits to the greatest degree possible. Response to public comments is due by April 8, 2016.*

Committee members thanked Michael, Stuart, and Deborah for the information. Ecology will keep the RAP committee informed of the PMR process. Ecology is tentatively scheduled to address the received comments with the RAP committee in April 2016.

### **Deep Boreholes**

Dirk Dunning, Oregon Department of Energy, gave a presentation on the DOE-headquarters' proposal for the potential use of deep boreholes as a strategy to dispose of smaller forms of hazardous waste. Dirk provided the committee with a synopsis of the information presented during a two-day U.S. Nuclear Waste Technical Review Board (NWTRB) workshop of international experts on deep boreholes held in October 2015. Key points from Dirk's presentation<sup>6</sup> include:

- The basic principle behind deep boreholes is to drill one or more boreholes into crystalline rock to approximately 5,000 meters in depth. Canisters containing waste would then be emplaced in the lower 2,000 meters of the borehole. The borehole would then be sealed above that level..
- A site to dispose of smaller waste forms needs to meet specific criteria including the occurrence of crystalline rock within 2000 meters of the Earth's surface, low seismic risk potential, low heat flow and moderate temperatures, absence of nearby populations, absence of commercial mineral resources and hazards, and absence of volcanoes or recent faults.
- The wastes proposed for possible consideration for disposal in deep borehole boreholes include cesium and strontium capsules from the Hanford Site.
- Waste may potentially be transferred into boreholes via three differing methods: drill string emplacement, wireline emplacement, or a coiled tube emplacement.
- DOE issued a request for proposals for siting a field test for an experimental deep borehole in April 2015. There was no solicitation for public comment on the site selection criteria and/or the test-site location. DOE received five proposals; a site located 15 miles south of Rugby, North Dakota was selected as the preferred field test-site. The site of the proposed test borehole is within approximately fifty miles of active wells in the Bakken oil shale formation.
- The characterization test for the deep borehole was approved on February 5, 2016. Drilling was expected to begin in September 2016, with a completion date of February 2017. Initial schedules indicated that the characterization borehole could be completed in January 2018, followed by tests for potential emplacement strategies. Results were scheduled to be evaluated in the fall of 2019.

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**Attachment 6:** Deep Boreholes (presented by Dirk Dunning, Oregon Department of Energy)



- A North Dakota Board of University and School Lands meeting took place on January 29, 2016 where many state leaders from North Dakota expressed concern and urged caution regarding the deep borehole proposal.
- The proposed potential advantages of depositing waste via deep boreholes include:
  - Alternative path for disposing small diameter waste forms
  - Does not utilize a large repository
  - Cost advantageous
- The potential disadvantages, risks, and uncertainties of depositing waste via deep boreholes include:
  - Lack of full site characterization or safety assessment performed
  - Lack of protection to the environment, as the bottom of the borehole would not be sealed
  - Single point failures could occur during operation, and there would be little ability to recover from them
  - Microbial organisms may exist at lower depths
  - Large suite of unknowns
- The Nuclear Waste Technical Review Board (NWTRB) convened a meeting in Washington, D.C. in October 2015, where an international panel of experts identified and discussed an array of severe problems, issues, challenges, and concerns as well as potential benefits with the proposed deep borehole disposal of wastes. Participants represented expertise included deep drilling in crystalline rocks, emplacement, seals, hydrogeology, geochemistry, barriers, and efficacy.
- The NWTRB developed a list of recommendations including independent expert review, comprehensive risk analysis, a developed operational safety strategy, geophysical subsurface characterization prior to drilling, a transparent pathway from the field test to siting, along with several others.

Dirk's presentation included a short video, showcasing the drill system that transports waste canisters into the borehole. The facilitation team noted that the presentation with video was a large file, available to HAB members on the HAB SharePoint site.

## *Committee Questions and Response*<sup>2</sup>

*Note: This section reflects individual questions, comments, and agency responses, as well as a synthesis where there were similar questions or comments.*

C. One option that the Board explored in past versions of the Cesium disposition white paper utilized deep boreholes. Issue managers discounted it because there were too many unknowns associated with the technology. This presentation furthers the notion that deep boreholes are not a viable option for waste disposition.

C. There are many assumptions made with this project. One such assumption is that water at depth does not move and that water is salty enough to aid in waste immobilization. Additionally, it was mentioned that the side walls will not be encased and there will be no protection from the waste at the bottom of the hole. Other deep boreholes have found fresh water at depth (e.g. Oslo, Norway), which is indicative of water exchange with the surface. This exchange could potentially facilitate the spread of contamination to the surface.

C. Drilling a straight hole to a depth of 5000 meters is extremely difficult. Plus, there was little mention of extended monitoring being done. This type of field test needs long-term studies before it could be considered a safe and effective disposition strategy.

*R. During the conference, there was a suggestion made to put monitors along the casings. It was also suggested to drill two holes and perform subsurface characterization between the two boreholes.*

Q. What is the path forward after the NWTRB met in October 2015?

*R. The selected proposal's contract was awarded and discussions with the State on a lease for land near Rugby, North Dakota are beginning. However, Pierce County, the county in which the field test-site was selected, recently announced a moratorium prohibiting future deep borehole drilling. Therefore, no movement on the characterization borehole is anticipated in the near future.*

## **Committee Business**

### *RAP 3-Month Work Plan*<sup>27</sup>

RAP will plan to hold a half-day joint committee meeting in March 2016 that will tentatively include the following topics:

- Discussion of potential draft advice on public involvement plan for ERDF vertical expansion.

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**Attachment 2:** Transcribed flipchart notes

**Attachment 2:** Transcribed Flipchart notes

**Attachment 7:** RAP 3-Month Work Plan

Final Meeting Summary

River and Plateau Committee

- Discussion of FY 2016 accomplishments at the six month mark and begin discussion of FY 2017 work plan topics for the May 2016 leadership workshop.
- Determine future committee leadership.
- Discussion of RAP input to Budgets and Contracts Committee for development of draft advice on the FY 2018 budget. The specific timing of this RAP/BCC discussion will be determined through the confirmation of committee week activities with the Executive Issues Committee.

In April 2016, RAP will tentatively plan to meet and discuss an update on SWOC, the 324 Building, 200-PW-1/3/6, and the Plutonium Finishing Plant demolition progress.

In May 2016, RAP will tentatively plan to meet and discuss an update on groundwater (specifically the results from the uranium sequestration test), ERDF cap design, and the extended periods of delay between drafts of plans and reports.

### **Attachments**

**Attachment 1:** Groundwater Update (DOE-RL presentation)

**Attachment 2:** Transcribed flipchart notes

**Attachment 3:** Update on 618-10 Burial Ground Vertical Pipe Units (DOE-RL presentation)

**Attachment 4:** Environmental Restoration and Disposal Facility Update (DOE-RL presentation)

**Attachment 5:** Solid Waste Operations Complex Dangerous Waste Permit Modifications (DOE-RL presentation)

**Attachment 6:** Deep Boreholes (presented by Dirk Dunning, Oregon Department of Energy)

**Attachment 7:** RAP 3-Month Work Plan

## Attendees

Board members and alternates:

Don Bouchey	Steve Hudson (phone)	Dick Smith (phone)
Jan Catrell	Mike Korenko	Bob Suyama
Shelley Cimon	Pam Larsen	Jean Vanni
Dirk Dunning	Susan Leckband	Dawn Wellman
Dale Engstrom	Gene Van Liew	Steve White
Gary Garnant (phone)	Liz Mattson (phone)	
Becky Holland	Emily Peterson (phone)	

Others:

Kristen Holmes, DOR-RL	Dennis Faulk, EPA	Phillip Lemley, City of Richland
Jon Peschong, DOE-RL	Dib Goswami, Ecology	Noah Cruz, CHPRC
Alex Teimouri, DOE-RL	Stuart Luttrell, Ecology	Samantha Herman, EnviroIssues
Ben Vannah, DOE-RL	Deborah Singleton, Ecology	Ryan Orth, EnviroIssues
	John Temple, Ecology	Jen Colburn, MSA
	Robin Varljen, Ecology	Jen Copeland, MSA
	Ginger Wireman, Ecology	Kelsey Shank, SN3
	John Martell, WDOH	Annette Cary, Tri-City Herald
	Tom Rogers, WDOH	Peter Bengston, WCH
		Bill Borlog, WCH
		Jeff Lerch, WCH
		Katherine Bittinger, WSU